

WHAT IS CLAIMED IS:

1. A superfinishing apparatus comprising:

a frame for holding entirety of the apparatus;

a cam shaft attached to the frame so as to rotate freely;

5 first and second eccentric cams which are attached to the cam shaft and rotate with a phase difference of 180 degrees therebetween;

a first vibrator having a polygonal shape in its section which moves in a sliding manner in accordance with rotation of  
10 the first eccentric cam;

a second vibrator having a polygonal shape in its section which is disposed so as to oppose to the first vibrator through the cam shaft and moves in a sliding manner in accordance with rotation of the second eccentric cam;

15 air bearings for supporting the first vibrator and the second vibrator; and

a superfinishing stone attached to the first vibrator or the second vibrator.

20 2. The superfinishing apparatus according to claim 1, wherein the first and the second vibrators have quadrangle cross-section.

3. The superfinishing apparatus according to claim 1, wherein the first and the second vibrators are static pressure slides.

5 4. The superfinishing apparatus according to claim 1, wherein the second vibrator is attached to an inside of the first vibrator.

5. The superfinishing apparatus according to claim 1, wherein  
10 the superfinishing stone is a super abrasive superfinishing stone.

6. The superfinishing apparatus according to claim 1 provided on a superfinishing apparatus for simultaneously finishing a  
15 raceway and a rib of an inner ring of a tapered roller bearing.